

Application No. 09/867,094

IN THE CLAIMS

1. (Currently Amended) An interconnect structure, comprising:

(a) a substrate having disposed thereon a topographical structure including a dielectric material and a recess formed therein;

(b) a tungsten silicide film disposed along a surface of the recess;

(c) a tungsten film overlaying said tungsten silicide film; and

(d) a tungsten plug deposited within the recess ~~on~~<sup>in</sup> said tungsten film and

(e) a second tungsten silicide film disposed between the tungsten film and tungsten plug.

2. (Cancelled)

3. (Original) The interconnect structure of claim 1 wherein a tungsten silicide gradient is deposited within said tungsten film.

4. (Original) The interconnect structure of claim 1 wherein said tungsten silicide film is deposited from a tungsten silicide target utilizing a sputtering procedure conducted in a deposition chamber.

5. (Original) The interconnect structure of claim 4 wherein said tungsten film is deposited from a tungsten coil utilizing a sputtering procedure conducted within a deposition chamber.

6. (Original) The barrier layer of claim 1 wherein said tungsten silicide film has a silicon to tungsten (Si:W) ratio greater than 2:1.

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7. (Original) A method for forming a barrier layer on an interconnect structure, comprising the steps of:

forming a first tungsten silicide film within a recess formed on a topographical structure on a semiconductor substrate;

forming a tungsten film onto said first tungsten silicide film; and,

forming a tungsten plug within said recess and over said tungsten film.

8. (Original) The method of claim 7 further including the step of forming a second tungsten silicide film, within the recess, between the tungsten film and the tungsten plug.

9. (Original) The method of claim 7 wherein the step of forming the first tungsten silicide film of the barrier layer includes sputtering the tungsten silicide from a tungsten silicide target in a deposition chamber.

10. (Original) The method of claim 7 wherein the step of forming the first tungsten film of the barrier layer includes sputtering the tungsten from a tungsten coil in a deposition chamber.

11. (Original) The method of claim 7 further including the step of depositing tungsten silicide gradient within the tungsten film of the barrier layer.

12. (Previously Presented) A semiconductor manufacturing system comprising:

a chamber within which sputter deposition is performed;

a tungsten silicide target mounted in the chamber;

a tungsten coil mounted in the chamber below the tungsten silicide target;

a pedestal adapted to support the semiconductor source, positioned below the tungsten coil; and,

means, associated with the chamber, for generation of a plasma within the chamber above the surface of the semiconductor device.

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13. (Original) The system of claim 12 further comprising a DC-power source coupled to the tungsten silicide target.

14. (Original) The system of claim 12 wherein said plasma generation means includes a source of an argon flow discharge connected to the chamber.

15. (Original) The system of claim 12 further comprising an RF-power source coupled to the tungsten coil.

16. (Original) The system of claim 12 further comprising an RF-power source coupled to the pedestal.

17. (Currently Amended) A method for forming a tungsten plug on a semiconductor device having a dielectric material formed over a substrate and a recess formed in the dielectric material, and said tungsten plug to be formed within the recess, the method comprising the steps of:

(a) conformally depositing tungsten silicide at a predetermined deposition rate to a substantially uniform predetermined thickness along walls of the recess to form a first film;

(b) conformally depositing tungsten to a substantially uniform predetermined thickness over the tungsten silicide within the recess while reducing the rate of deposition of the tungsten silicide for the first film at about the same time as, or after starting the deposition of tungsten for the second film within the recess and, after said tungsten silicide reaches said predetermined thickness thereof to form a second film;

(c) depositing tungsten silicide within the recess while said tungsten is being deposited within the recess thereby forming a tungsten silicide gradient within said second film; and,

(d) depositing tungsten within the recess over the second film to form said tungsten plug.

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18. (Cancelled)

19. (Currently Amended) The method of claim 18 17 further comprising the steps of providing a chamber within which the deposition of the tungsten silicide and tungsten takes place; positioning the semiconductor device within the chamber; providing a tungsten silicide target and a tungsten coil within the chamber; and, generating a plasma within the chamber adjacent the semiconductor device for the sputter deposition of tungsten silicide from the target and the sputter deposition of tungsten from the coil.